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# *Module 3*

# *Scotch Whisky*

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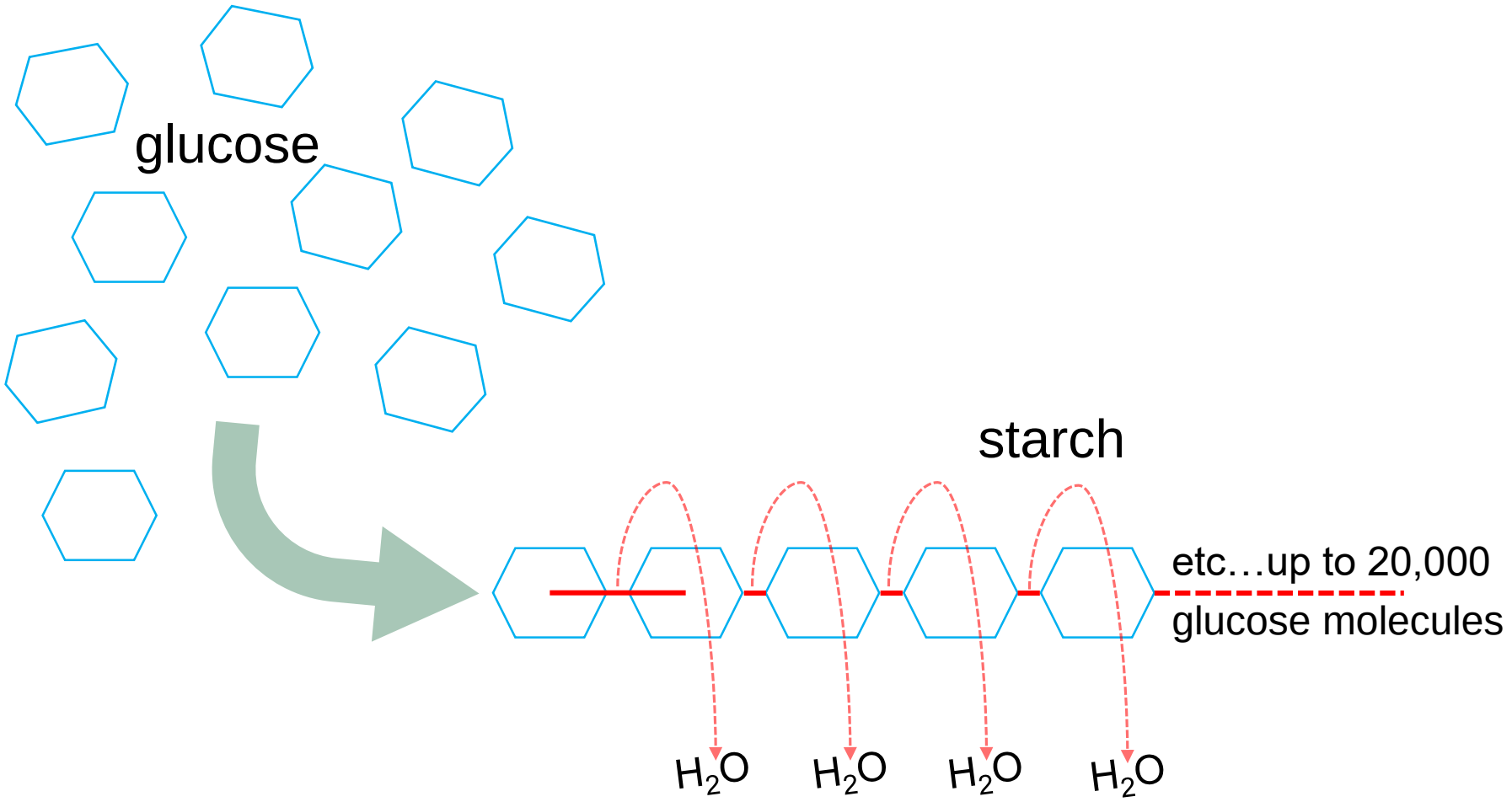
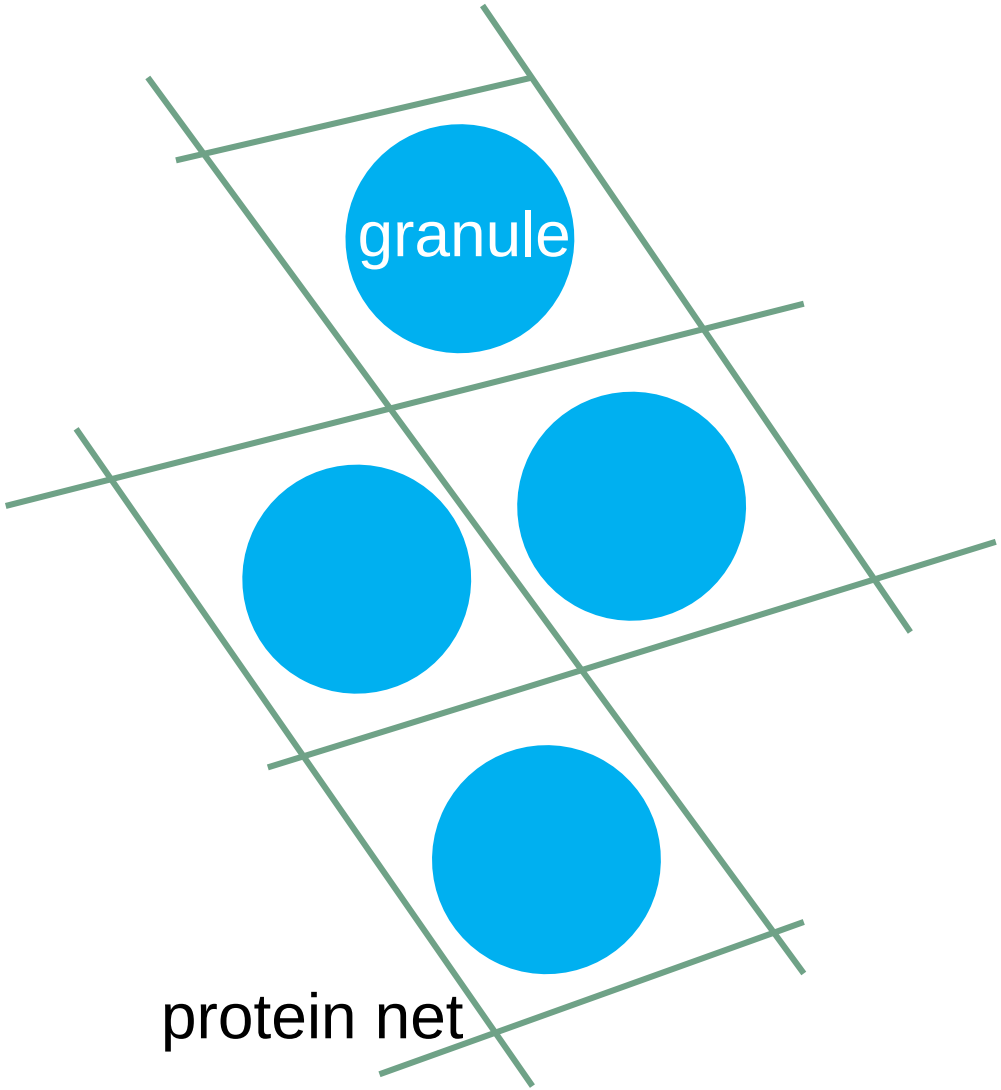
# *Starch formation*



# *Starch granules*




## *Potatoes*

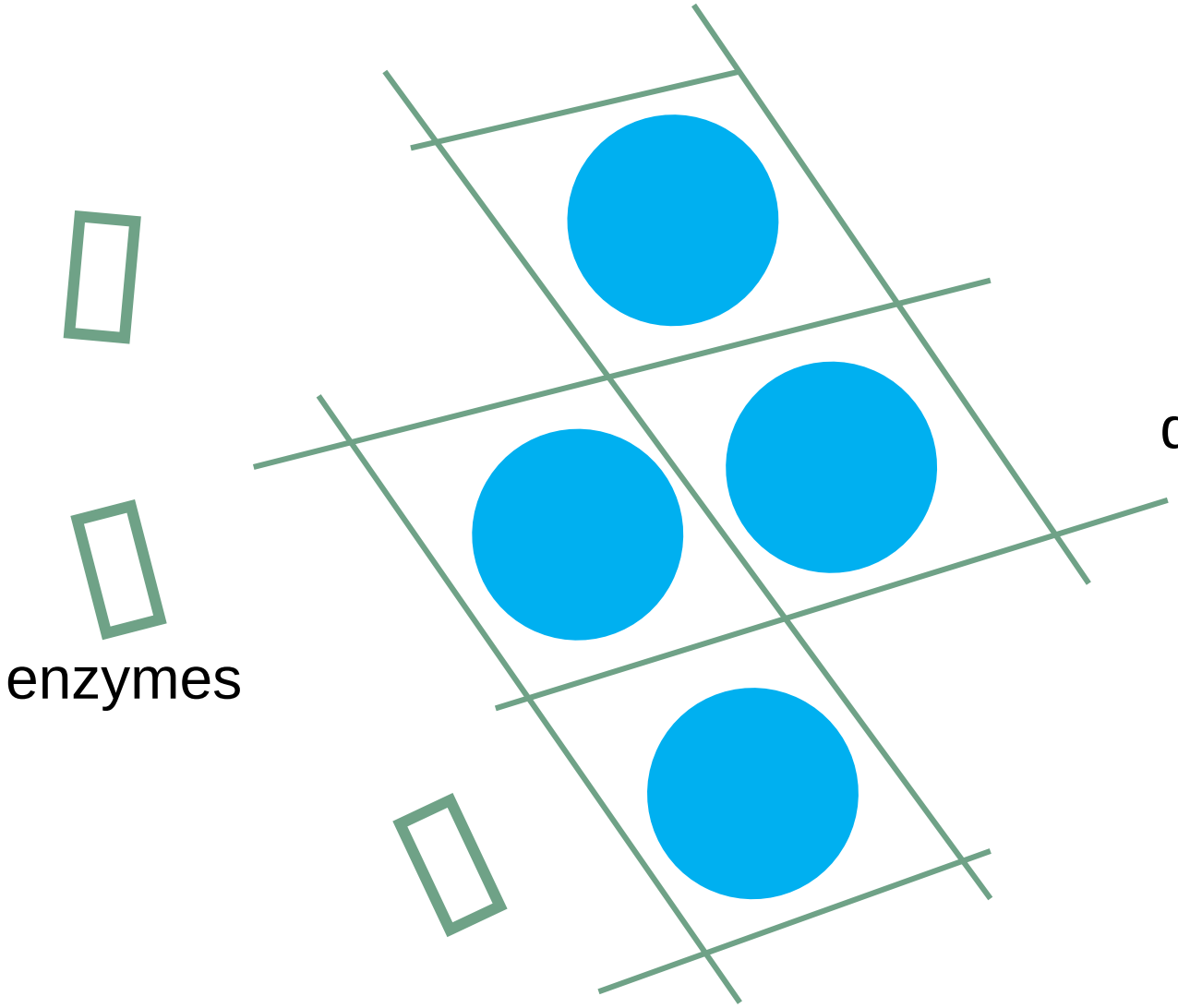
stored in living cells

## *Grains*

stored in a protein net

# *Modification*

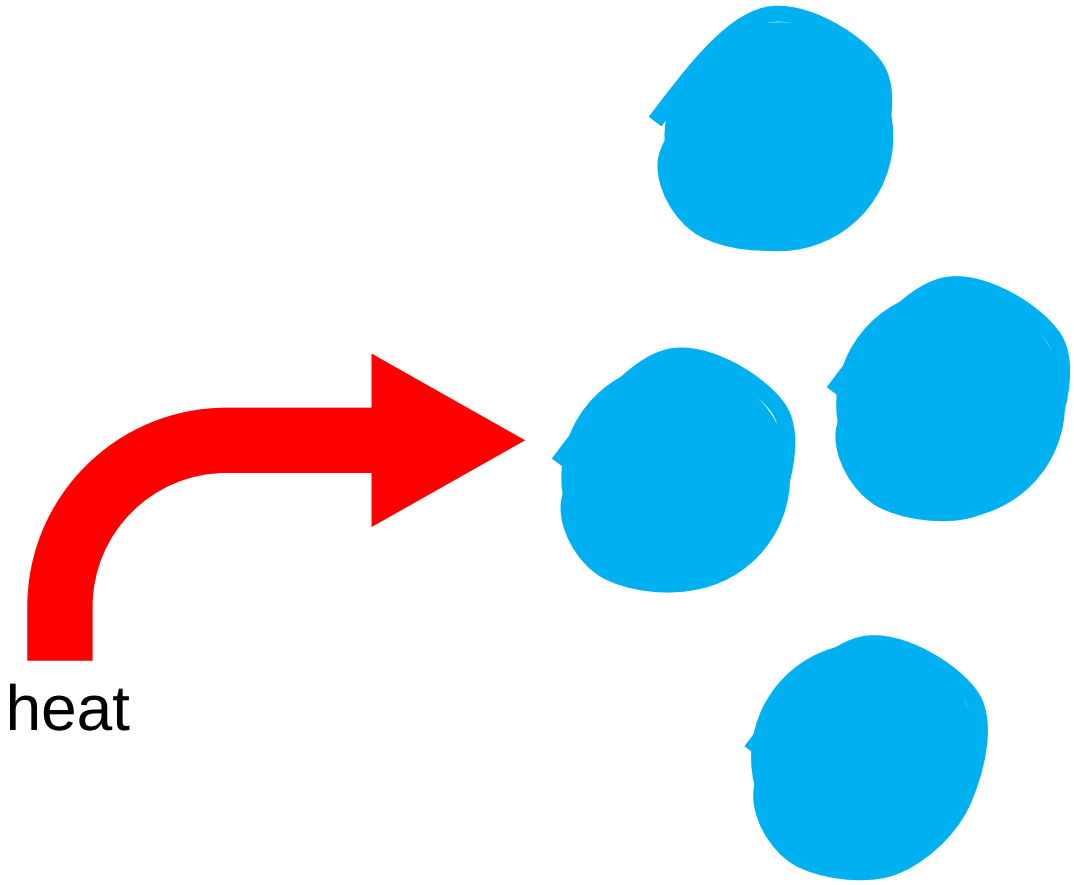
## *grains only*




enzymes break down protein net

high heat could also be used

# *Gelatinisation*




starch balls unravel and become soluble

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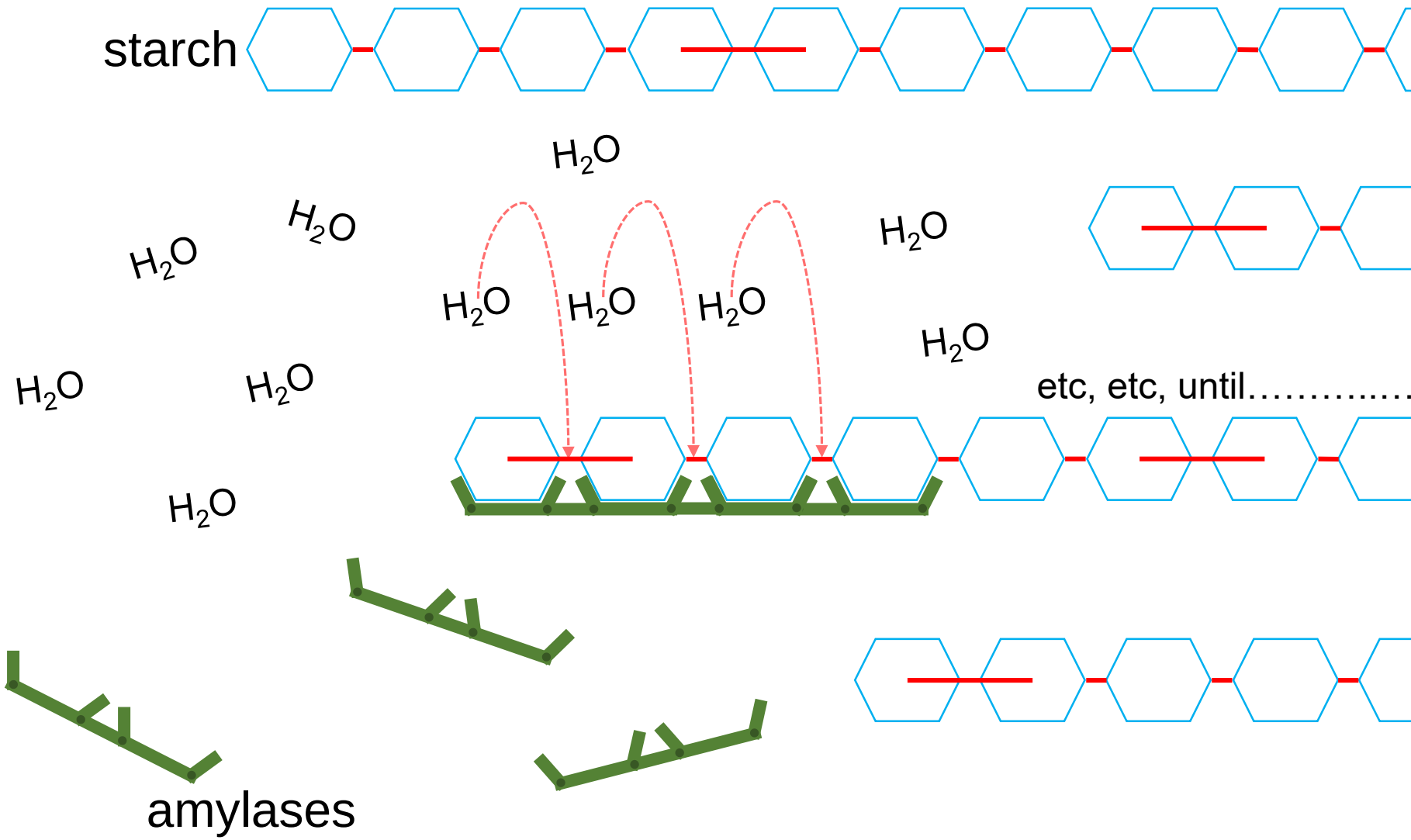
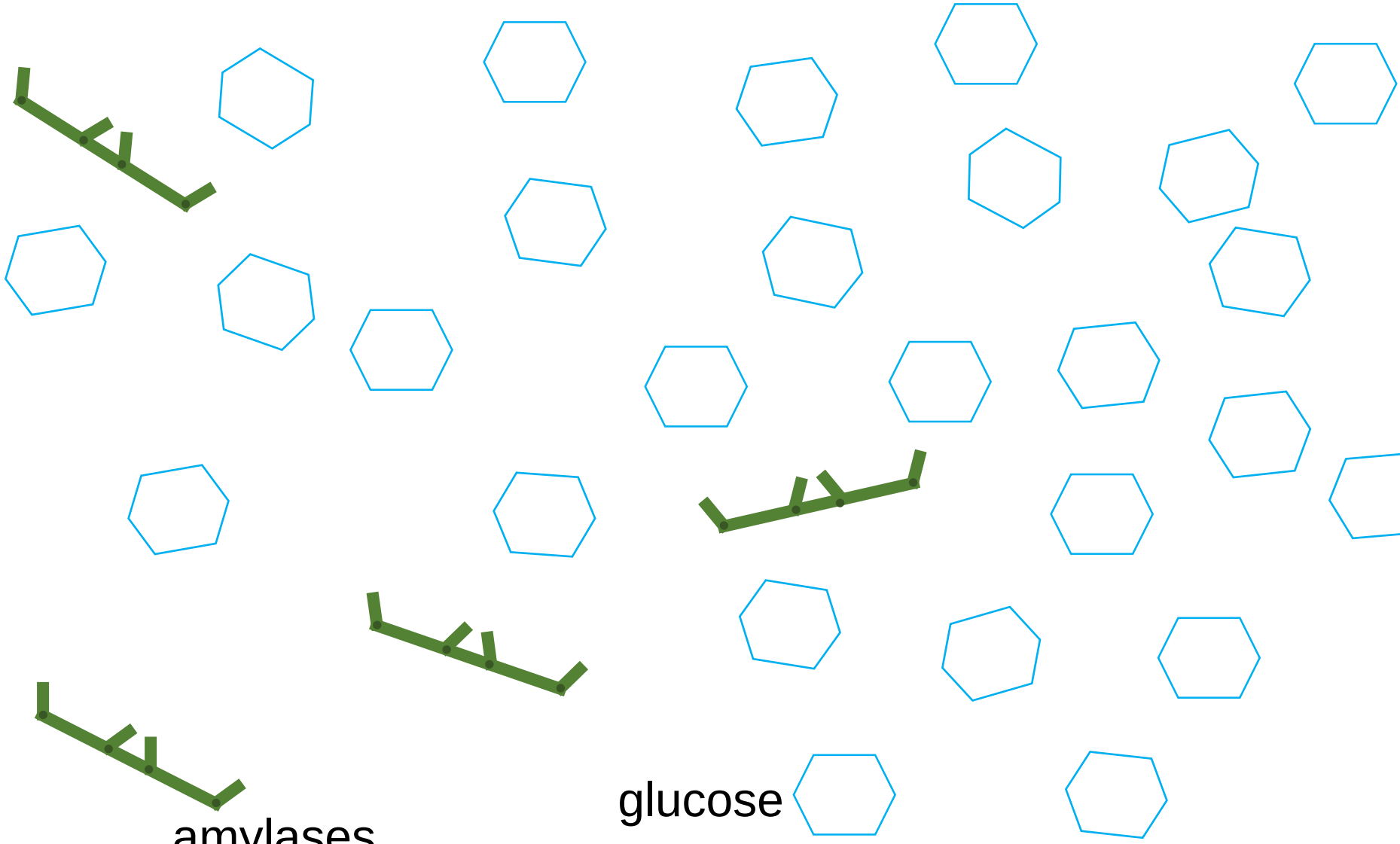
# Enzymatic hydrolysis



# *Enzymatic hydrolysis*

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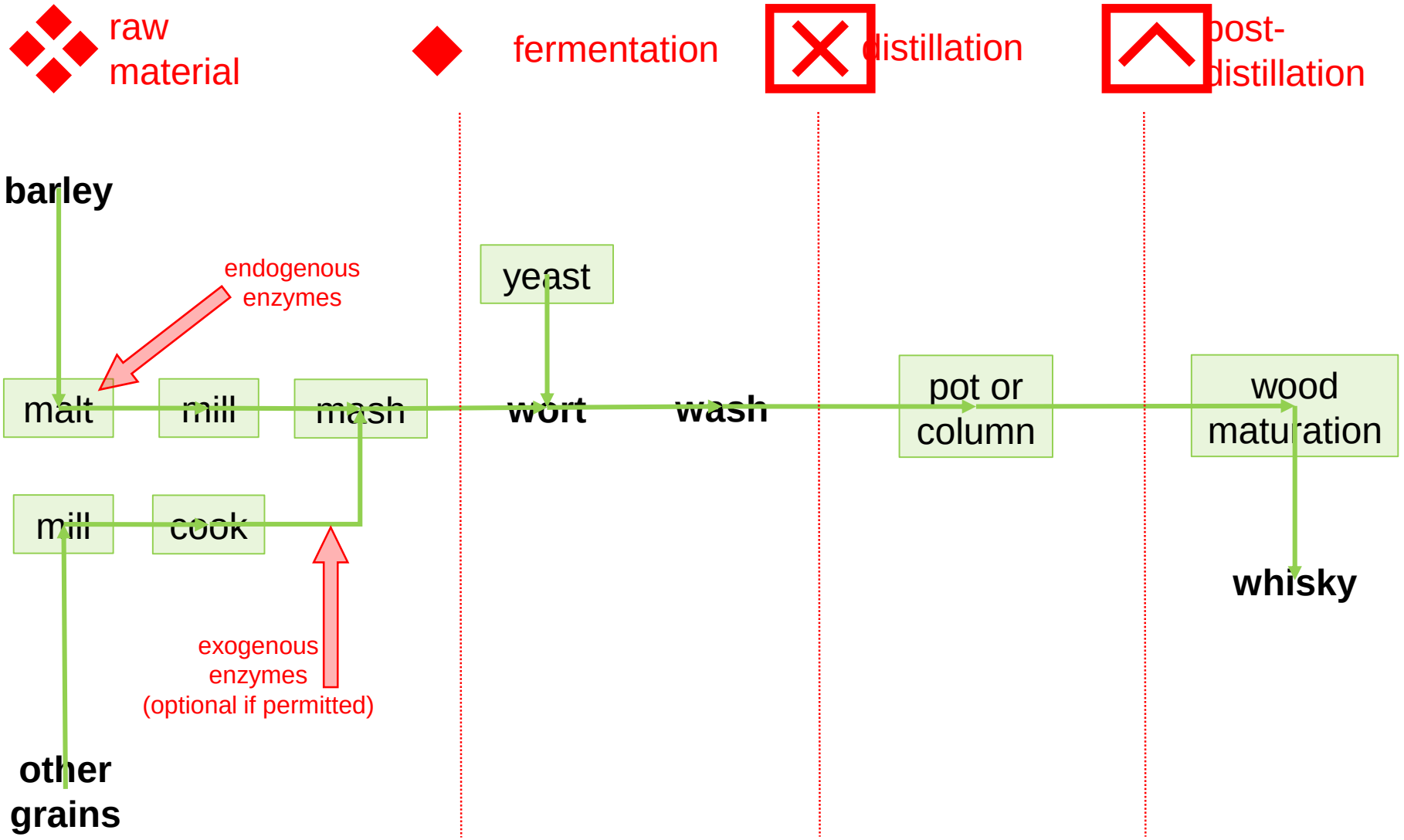
# How is whisky made?

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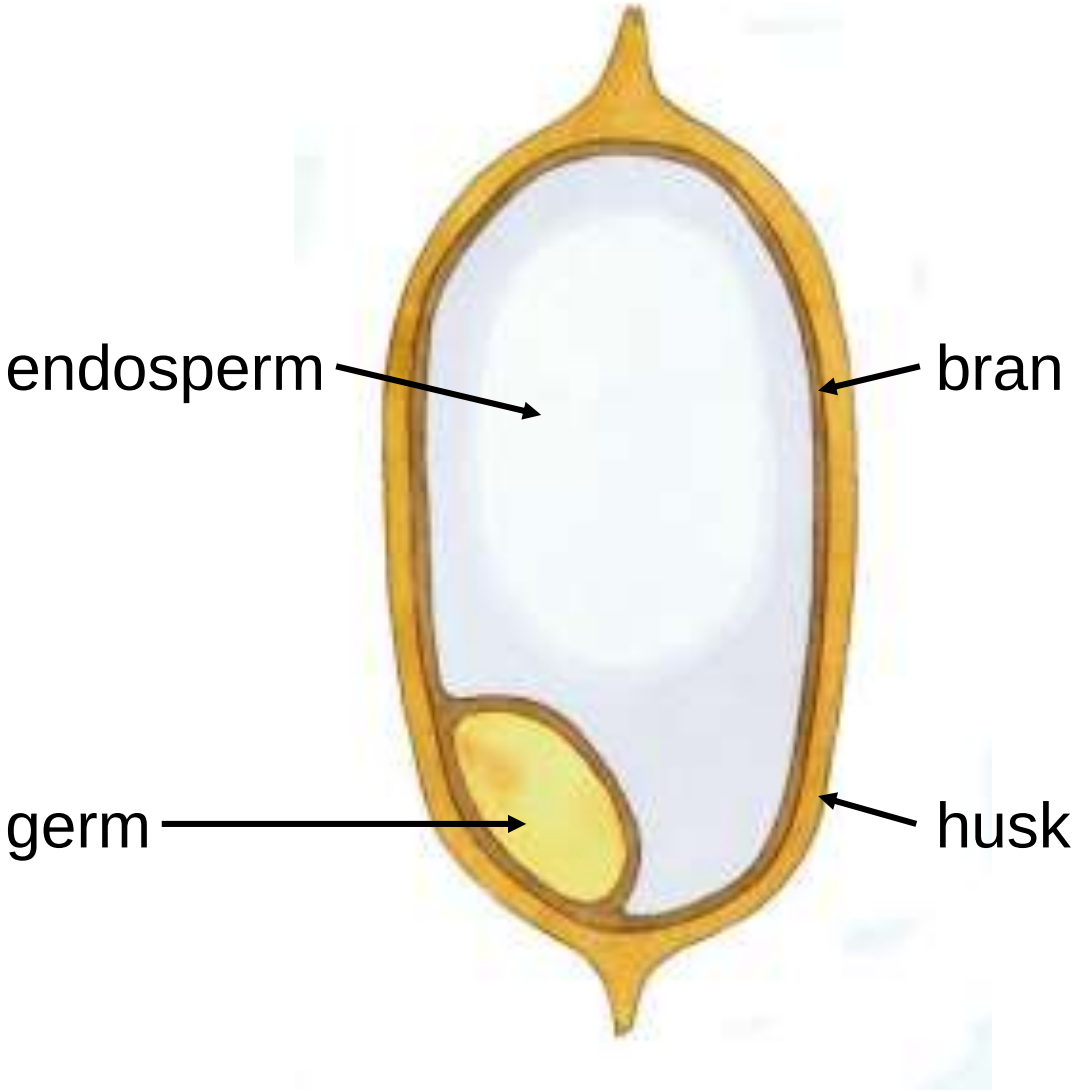
# *Parts of a grain*



# Malting barley

barley

green malt

malted barley

modification, release of amylases

growth stopped

hot air, smoke

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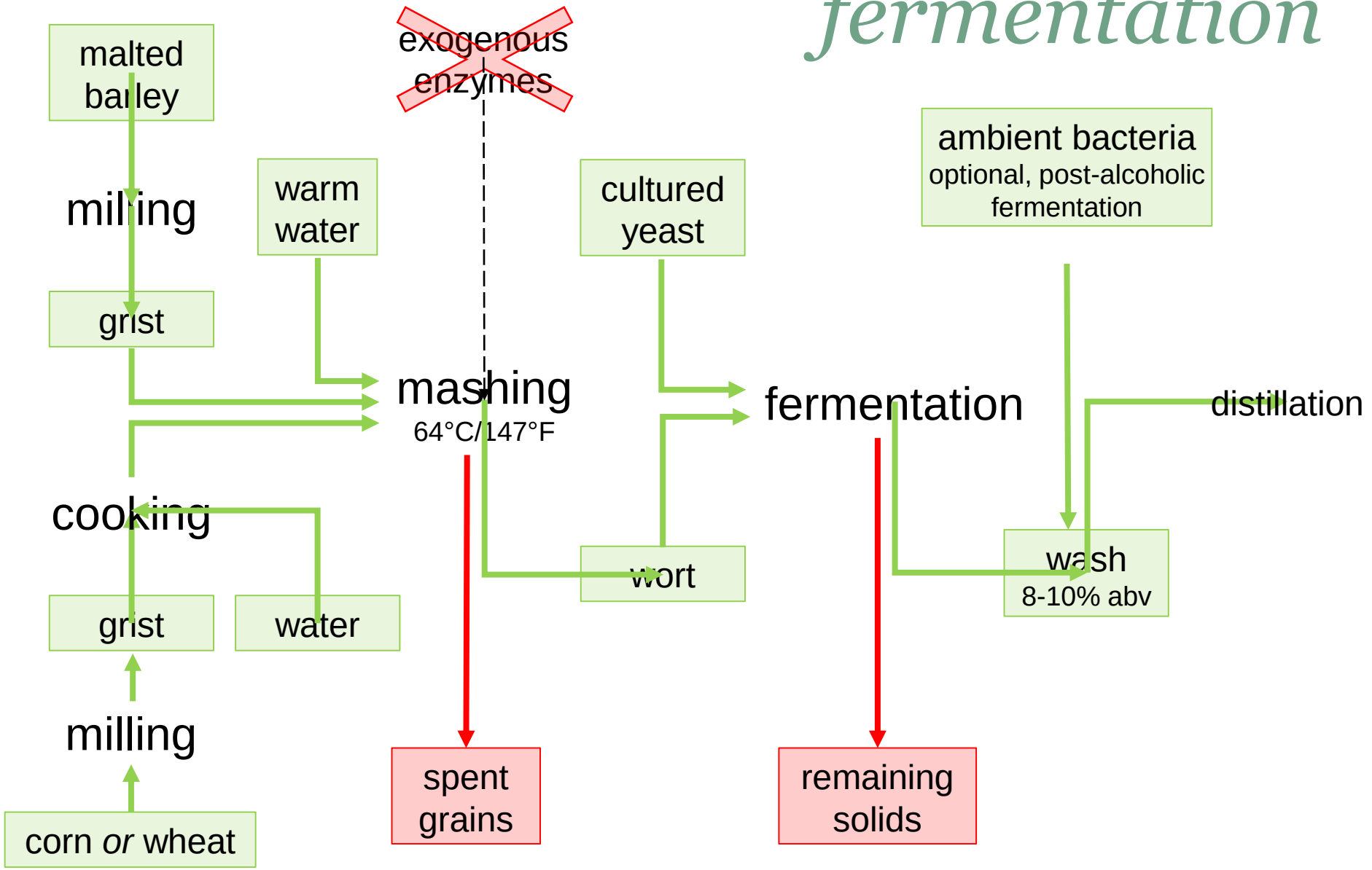
# Peat

# Milling, mashing & fermentation

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# Distillation

## Distillation strength

- less than 94.8% abv

## Malt whisky

- pot stills must be used
- design and operation up to the distiller

## Grain whisky

- any still may be used
- column stills are used

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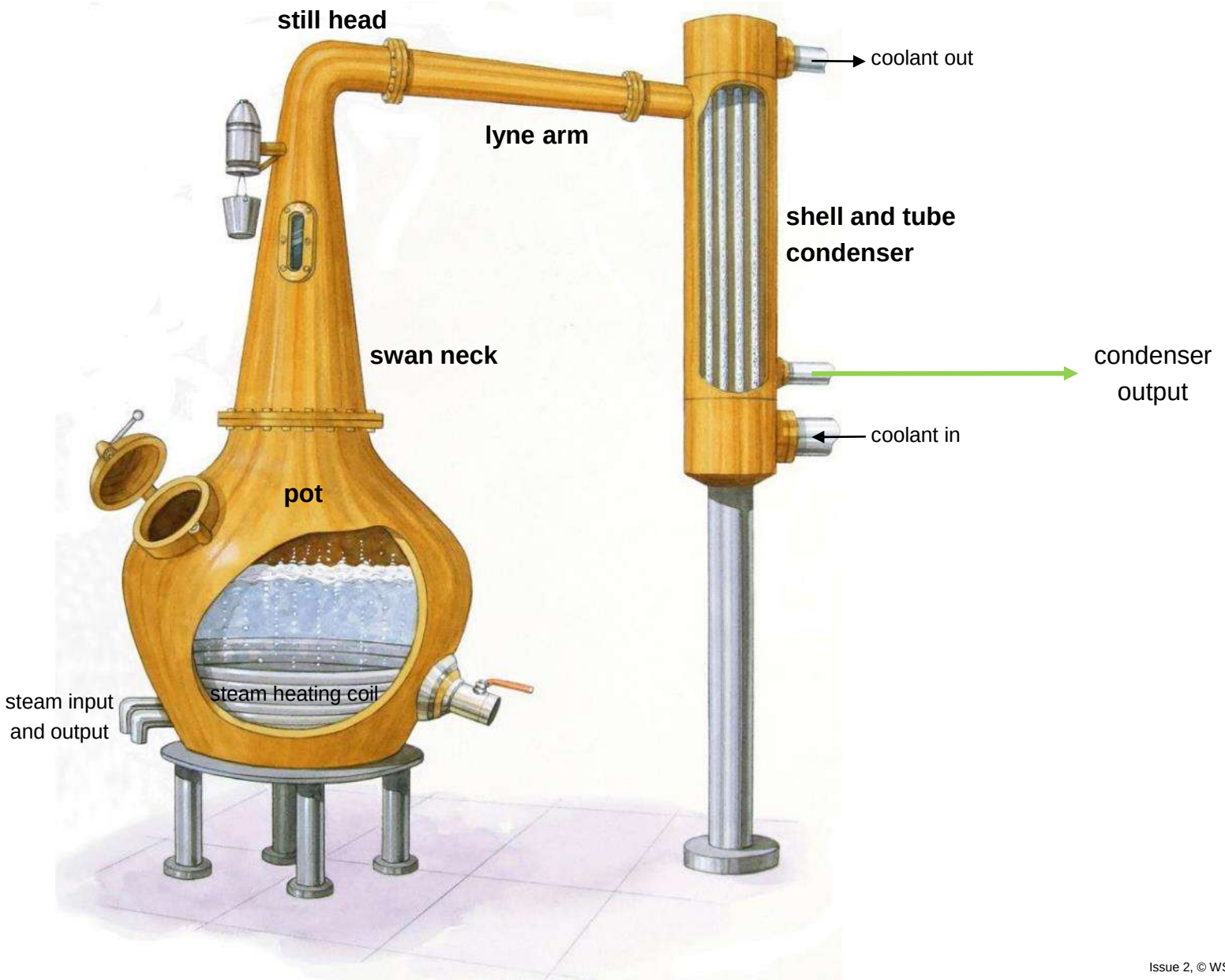
# Pot stills in Scotland

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# Pot still distillation options

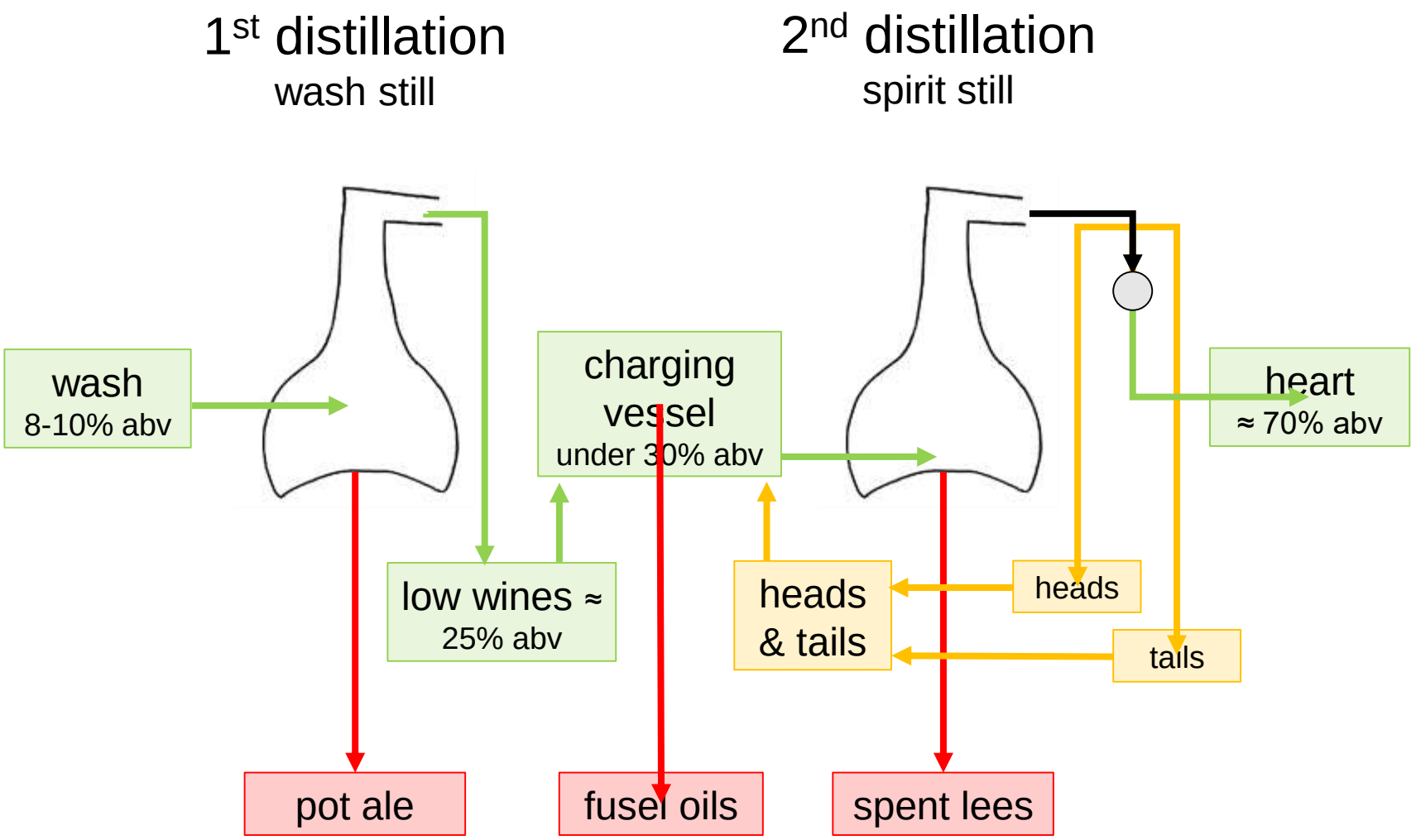
## Still design

- direct *or* steam heat
- height
- angle of lyne arm
- purifier
- type of condenser

## Still operation

- timing of cuts

# Double pot still distillation

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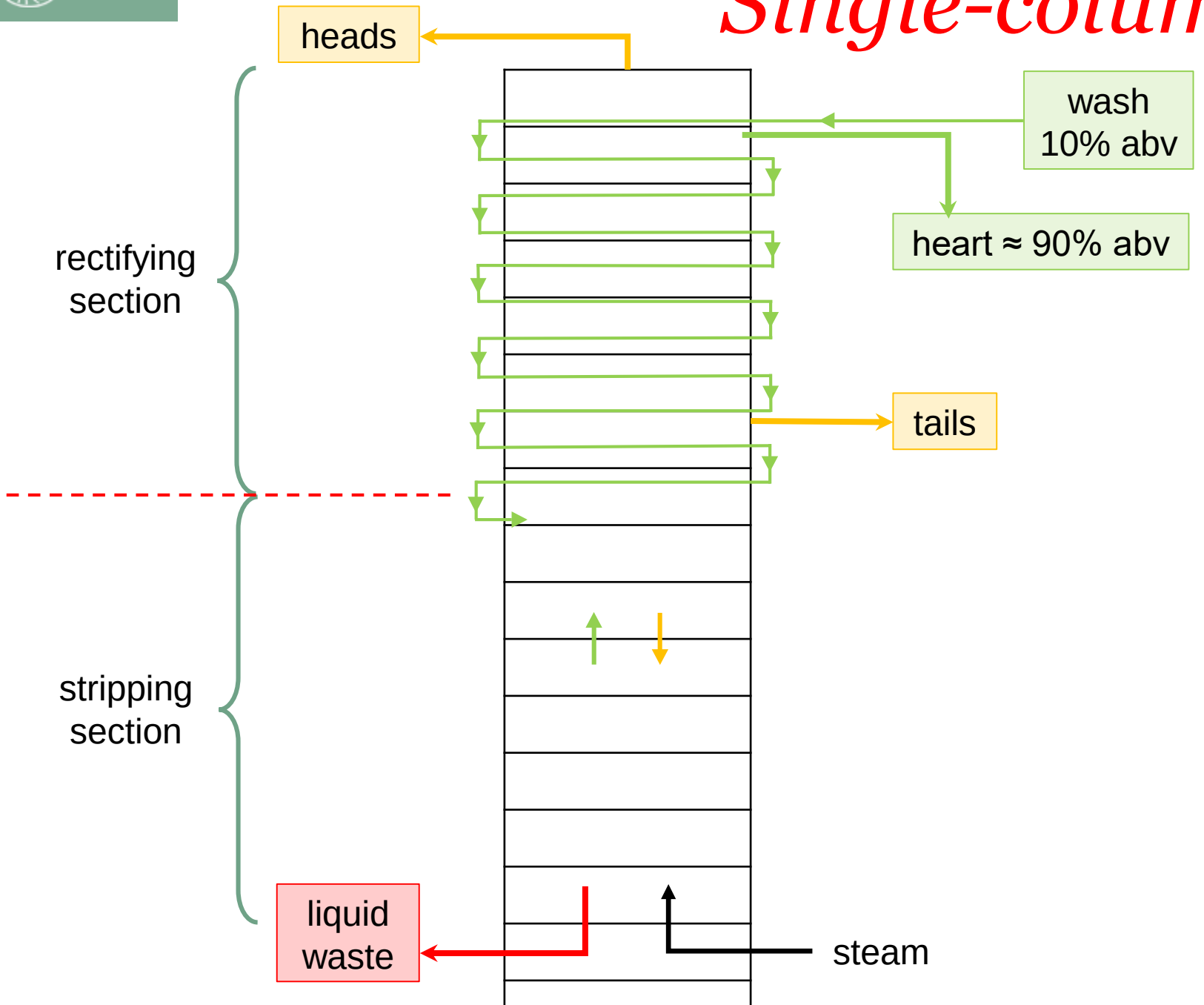
# Single-column

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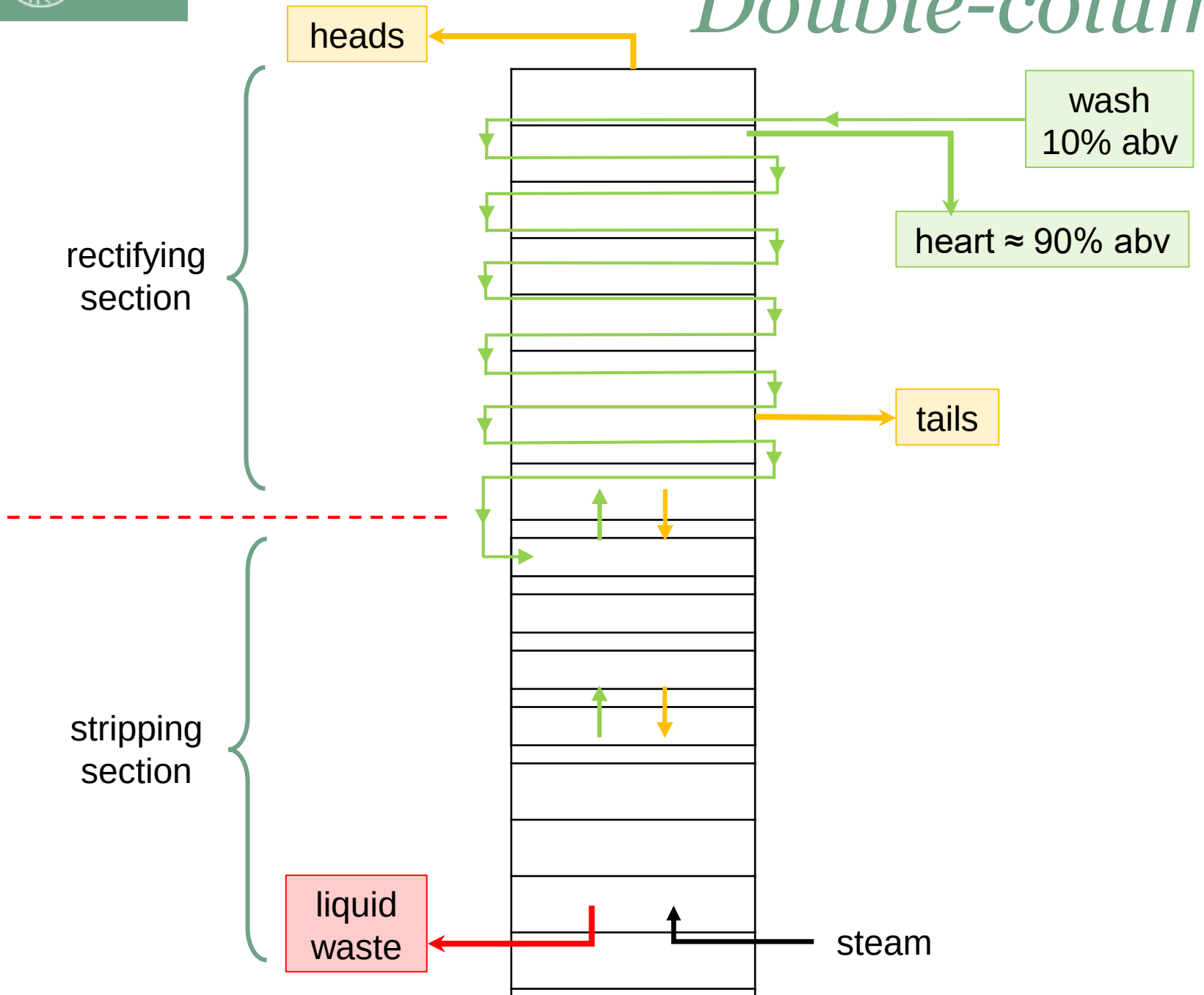
# Double-column

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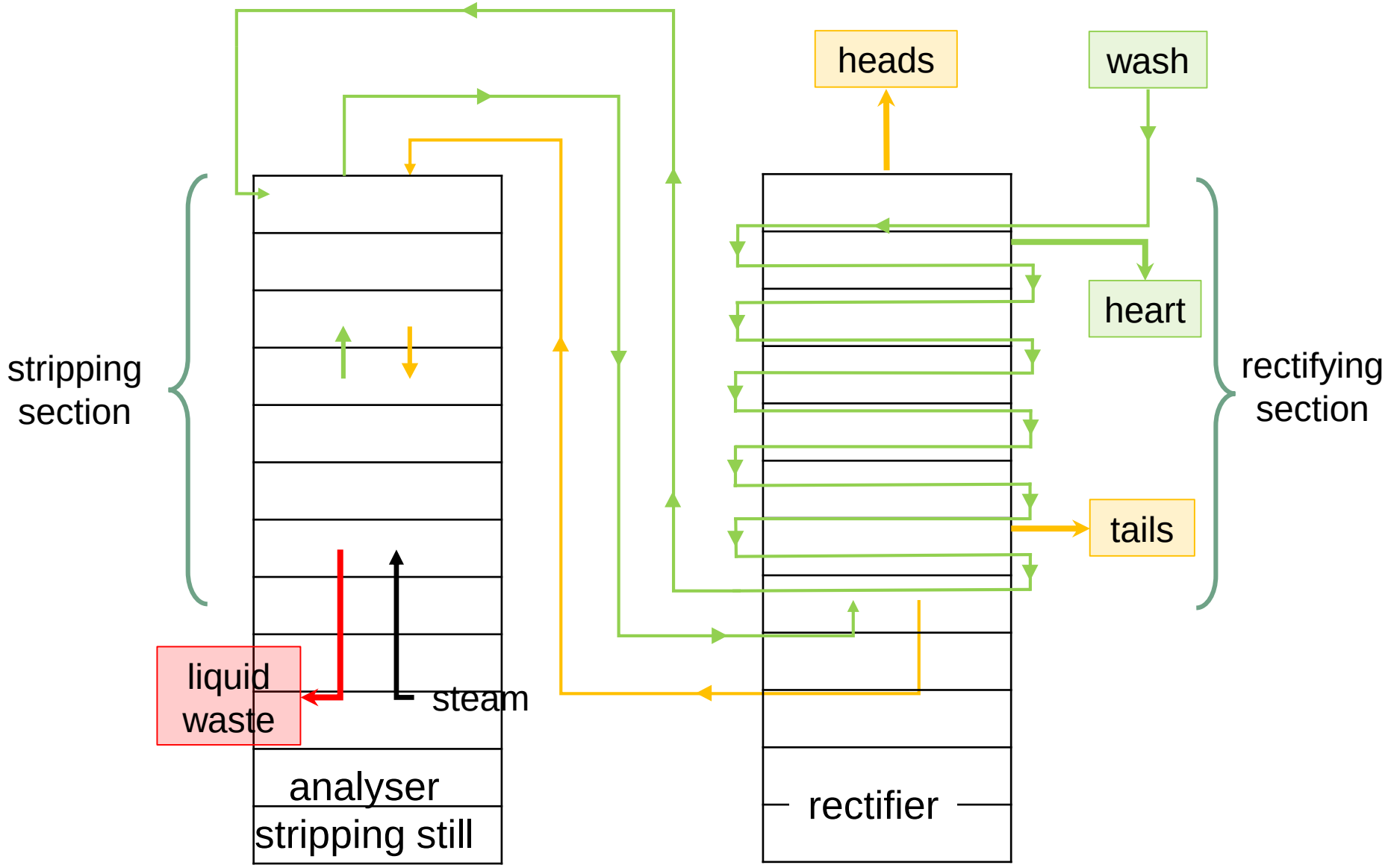
# Double-column

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# Post-distillation

## Legal requirements

- minimum 3 years in oak barrels of 700 L or less
- maturation in Scotland

## Labelling and age

- age statement
- vintage

# Post-distillation

## Barrel types

- ex-ASB
- ex-Sherry
- other ex-wine, ex-spirit barrels

## Warehouse types

- centralised *or* distillery
- dunnage *or* racked *or* palletised

## Barrel management

- 1st fill, 2nd fill, etc. + type
- position in the warehouse
- finishing

} • typically static

# Post-distillation

## Blending

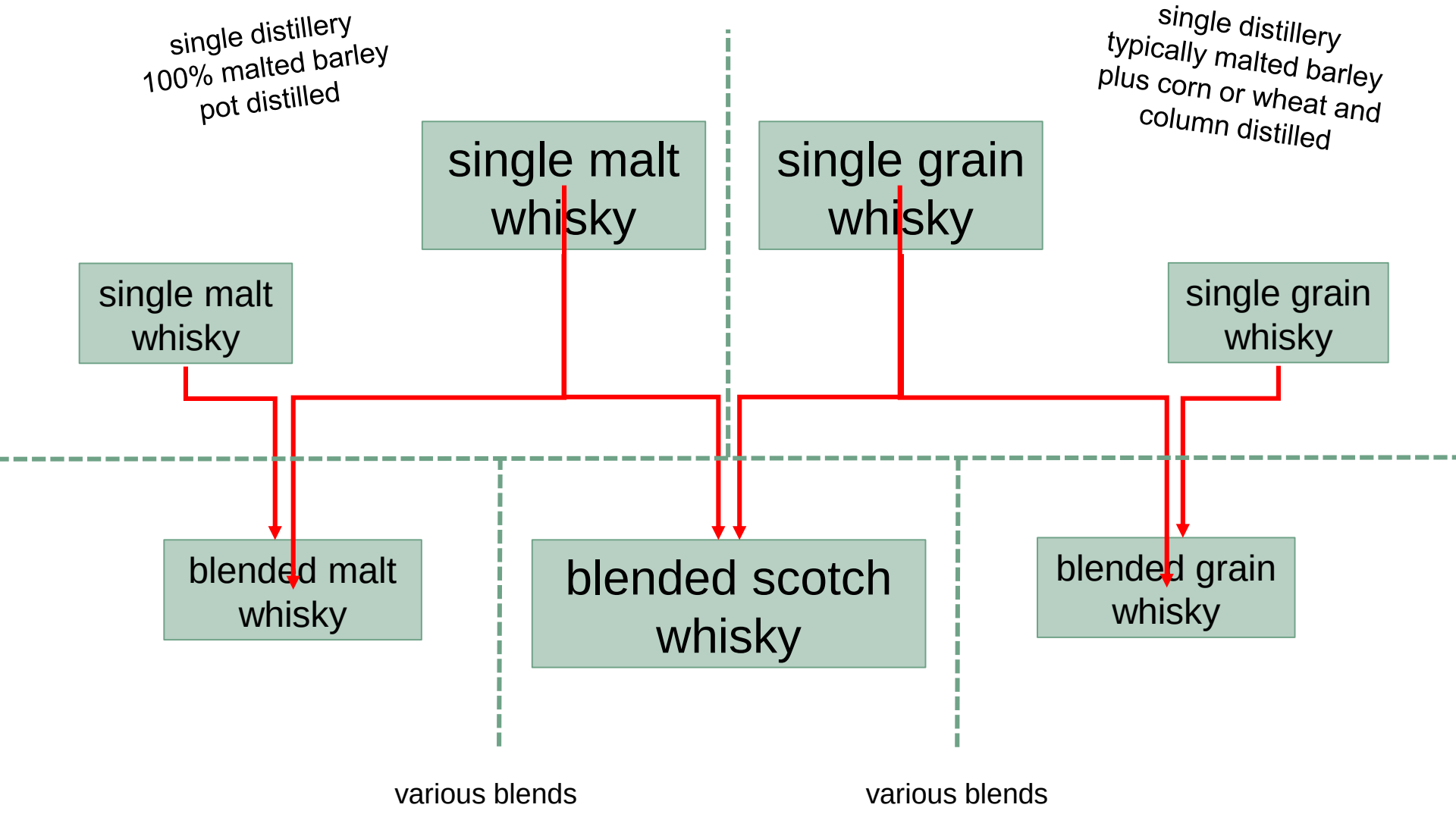
- consistency
- complexity

## Final steps

- chill-filtration (non-chill-filtered)
- permitted additions
  - water (cask strength)
  - minimum bottling strength 40% abv
  - caramel colour E150a (natural colour)

# Scotch whisky

## types and labelling terminology



# Scotch whisky

## *types and labelling terminology*